Claims

1. A lighting fixture for generating white light, said fixture comprising:

a plurality of component illumination sources, said plurality including component illumination sources producing electromagnetic radiation of at least two different spectrums, each of said spectrums having a maximum spectral peak outside the region 510 nm to 570 nm; and

a mounting holding said plurality, said mounting designed to allow said spectrums of said plurality to mix and form a resulting spectrum;

wherein, said resulting spectrum is continuous within the photopic response of the human eye.

2. The lighting fixture of claim 1 wherein said component illumination sources include LEDs.

3. The lighting fixture of claim 1 wherein at least one illumination source is not an LED.

4. The lighting fixture of claim 3 wherein said at least one illumination source that is not an LED has a maximum spectral peak within the region 510 nm to 570 nm

5. The lighting fixture of claim 1 wherein said white light can be generated at a color temperature within a preselected range of color temperatures.

6. The lighting fixture of claim 5 wherein said range of color temperatures extends from above 500K to about 10,000K.

7. The lighting fixture of claim 5 wherein said range of color temperatures extends from about 2300K to about 4500K.

8. The lighting fixture of claim 5 further comprising

A controller, said controller enabling a particular color temperature within said range of color temperatures to be selected, and to have said lighting fixture produce said particular color temperature

9. The lighting fixture of claim 1 wherein said at least two different spectrums comprises exactly two different spectrums.

10. The lighting fixture of claim 1 wherein said at least two different spectrums comprises exactly three different spectrums.

11. The lighting fixture of claim 1 wherein said resulting spectrum is continuous in the region from 400nm to 700nm.

12. The lighting fixture of claim 1 further comprising a filter effecting the spectrum of at least one of said plurality.

13. The lighting fixture of claim 12 wherein said filter is selected to allow said lighting fixture to produce a preselected range of color

14. The lighting fixture of claim 12 wherein said filter is selected from a plurality of different filters.

15. The lighting fixture of claim 1 wherein at least one of said component illumination sources has a maximum spectral peak less than 400 nm.

16. The lighting fixture of claim 1 wherein at least one of said component illumination sources has a maximum spectral peak greater than 700 nm.

17. A lighting fixture comprising:

a plurality of LEDs, each of said plurality producing one of three preselected spectrums, each of said spectrums having a maximum spectral peak outside the region bounded by 530nm and 570nm;

wherein additive interference of said spectrums results in white light.

18. The lighting fixture of claim 17 wherein at least one of said preselected spectrums has a maximum spectral peak of about 450nm

19. The lighting fixture of claim 17 wherein at least one of said preselected spectrums has a maximum spectral peak of about 592nm.

20. The lighting fixture of claim 17 wherein said white light can be controlled to produce white light within a range of color temperatures.

21. The lighting fixture of claim 20 wherein said range of color temperatures extends from about 500K to about 10,000K

22. The lighting fixture of claim 20 wherein said range of color temperatures extends from about 2300K to about 4500K.

23. The lighting fixture of claim 20 further comprising:

a controller, said controller enabling a particular color temperature within said range of color temperatures to be selected, and a signal to be generated representing that color temperature; and

a processor in communication with said plurality of LEDs, said processor capable of receiving said signal from said controller and controlling the intensity of each of said plurality of LEDs.

24. An LED lighting fixture for use with a device designed to hold florescent tubes comprising:

a mounting;

an LED mounted on said mounting;

a connector mounted on said mounting, said connector capable of connecting with said device to provide power from said device to said LED; and

and circuit electrically connected to said LED and said device to convert said power from a ballast voltage to a DC voltage.

25. A lighting fixture for replacing florescent tubes comprising:

a mounting;

at least two component illumination sources mounted on said mounting;

a connector mounted on said mounting, said connector capable of connecting with a device adapted for holding florescent tubes to receive power from said device and provide power to said at least two component illumination sources;

a control circuit for controlling said at least two component illumination sources.

26. The lighting fixture of claim 25 wherein said component illumination sources comprise LEDs.

27. The lighting fixture of claim 25 wherein said control circuit comprises a processor.

28. The lighting fixture of claim 25 further comprising a housing for said mounting.

29. The lighting fixture of claim 28 wherein said housing is generally cylindrical in shape.

30. The lighting fixture of claim 28 wherein said housing includes a filter.

31. The lighting fixture of claim 24 wherein said housing is at least partially at least one of transparent or translucent

32. The lighting fixture of claim 25 wherein said control circuit can control said at least two component illumination sources based on the power provided by said lamp.

33. The lighting fixture of claim 25 wherein said lighting fixture produces white light.

34. A system for controlling illumination conditions, comprising:

a lighting fixture for providing illumination of any of a range of colors, said lighting fixture being constructed of a plurality of component illumination sources;

a processor coupled to said lighting fixture for controlling said lighting fixture; and

a controller coupled to the processor for specifying illumination conditions to be provided by the lighting fixture.

35. The system of claim 34 wherein said plurality of component illumination sources includes LEDs.

36. The system of claim 34 wherein said controller includes at least one of computer hardware or computer software.

37. The system of claim 34 wherein said controller comprises a sensor.

38. The system of claim 37, wherein the sensor comprises a photodiode, a radiometer, a photometer, a colorimeter, a spectral radiometer, or a camera.

39. The system of claim 37, wherein the sensor comprises a spectral radiometer or a colorimeter.

40. The system of claim 34, wherein said plurality of component illumination sources include component illumination sources of at least three colors.

41. The system of claim 34, wherein the processor includes a memory of predetermined color conditions.

42. The system of claim 34, wherein said memory includes a database.

43. The system of claim 41, wherein the processor includes an interface-providing mechanism for providing a user interface.

44. The system of claim 43, wherein the user interface includes a color spectrum, a color temperature spectrum, or a chromaticity diagram.

45. The system of claim 34 wherein said controller includes a manual interface.

46. The system of claim 45, wherein the manual interface includes a device selected from a slider, a dial, a switch, a multipole switch, a joystick, a trackpad, or trackball.

47. The system of claim 34 further comprising a second source of illumination.

48. The system of claim 47 wherein said controller specific illumination conditions for said lighting fixture based on the illumination of said lighting fixture and said second source of illumination.

49. The system of claim 47 wherein said second source of illumination comprises a florescent bulb, an incandescent bulb, a mercury vapor lamp, a sodium vapor lamp, an arc discharge lamp, sunlight, moonlight, candlelight, an LED display system, an LED, or a lighting system controlled by pulse width modulation.

50. The system of claim 47 wherein the combined light from said lighting fixture and said second source is a desired color temperature.

51. A method for controlling illumination conditions, comprising:

generating light having color and brightness using a lighting fixture capable of generating a light from within a range of colors;

measuring illumination conditions; and

modulating the color or brightness of the generated light to achieve a target illumination condition.

52. The method of claim 51, wherein measuring illumination conditions includes detecting color characteristics of the illumination conditions using a light sensor.

53. The method of claim 52, wherein detecting color characteristics of the illumination conditions includes using a photodiode, a radiometer, a photometer, a colorimeter, a spectral radiometer, or a camera.

54. The method of claim 51, further comprising selecting a target illumination condition.

55. The method of claim 54, wherein selecting a target illumination condition includes selecting a target color temperature.

56. The method of claim 54, wherein selecting a target illumination condition includes:

providing an interface comprising a depiction of a color range; and

selecting a color within the color range.

57. The method of claim 51, wherein measuring illumination conditions includes visually evaluating illumination conditions, and modulating the color or brightness of the generated light includes varying the color or brightness of the generated light using a manual interface.

58. The method of claim 51, wherein measuring illumination conditions includes detecting color characteristics of the illumination conditions using a light sensor, and modulating the color or brightness of the generated light includes varying the color or brightness of the generated light using a processor until color characteristics of the illumination conditions detected by the light sensor match color characteristics of the target illumination conditions.

59. The method of claim 51, further comprising providing a second source of illumination.

60. The method of claim 59, wherein the step of measuring illumination conditions includes detecting light generated by the lighting fixture and by the second source of illumination.

61. The method of claim 59, wherein the second source of illumination comprises a fluorescent bulb, an incandescent bulb, a mercury vapor lamp, a sodium vapor lamp, an arc discharge lamp, sunlight, moonlight, candlelight, an LED lighting system, an LED, or a lighting system controlled by pulse width modulation.

62. The method of claim 51, wherein modulating the color or brightness of the generated light includes varying the illumination conditions to achieve a target color temperature.

63. The method of claim 51 wherein said lighting fixture comprises one of a plurality of lighting fixtures, capable of generating a range of colors.

64. A method for designing a lighting fixture comprising:

selecting a desired range of colors to be produced by said lighting fixture;

choosing a selected color of light to be produced by said lighting fixture when said lighting fixture is at maximum intensity; and

designing said lighting fixture from a plurality of illumination sources such that said lighting fixture can produce said range of colors, and produces said selected color when at maximum intensity.

65. The method of claim 64 wherein said plurality of illumination sources includes LEDs.

66. A lighting fixture for generating white-light said fixture comprising:

a plurality of component illumination sources, said plurality including component illumination sources producing electromagnetic radiation of at least two different spectrums.

a mounting holding said plurality, said mounting designed to allow said spectrums of said plurality to mix and form a resulting spectrum;

wherein, the visible portion of said resulting spectrum has intensity greater than background noise at its lowest spectral valley.

67. The lighting fixture of claim 66 wherein said resulting spectrum has intensity at its lowest spectral valley which is at least 5% of its intensity at its maximum spectral peak.

68. The lighting fixture of claim 66 wherein said resulting spectrum has intensity at its lowest spectral valley which is at least 10% of its intensity at its maximum spectral peak.

69. The lighting fixture of claim 66 wherein said resulting spectrum has intensity at its lowest spectral valley which is at least 25% of its intensity at its maximum spectral peak.

70. The lighting fixture of claim 66 wherein said resulting spectrum has intensity at its lowest spectral valley which is at least 50% of its intensity at its maximum spectral peak.

71. The lighting fixture of claim 66 wherein said resulting spectrum has intensity at its lowest spectral valley which is at least 75% of its intensity at its maximum spectral peak.

72. The lighting fixture of claim 66 wherein said component illumination sources include LEDS.

73. The lighting fixture of claim 66 wherein said white light can be generated at a color temperature within a preselected range of color temperatures.

74. The lighting fixture of claim 73 further comprising:

a controller, said controller enabling a particular color temperature within said range of color temperatures to be selected, and to have said lighting fixture produce said particular color temperature.

75. The lighting fixture of claim 74 wherein the CRI of the lighting fixture at 4800K is at least 80.

76. The lighting fixture of claim 75 wherein the CRI of the lighting fixture of 2300K is at least 50.

77. The lighting fixture of claim 66 wherein at least one of said plurality of component illumination sources includes a phosphor.

78. The lighting fixture of claim 66 wherein at least one of said plurality of component illumination sources comprises an LED including a phosphor.

79. The lighting fixture of claim 76 wherein said LED produces white light.

80. A lighting fixture for generating white light said fixture comprising:

a plurality of component illumination sources, said plurality including component illumination sources producing electromagnetic radiation of at least two different spectrums;

a mounting holding said plurality, said mounting designed to allow said spectrums of said plurality to mix and form a resulting spectrum;

wherein, said resulting spectrum does not have a valley at a longer wavelength than the maximum spectral peak within the photopic response of the human eye.

81. The lighting fixture of claim 80 wherein said component illumination sources includes LEDs.

82. The lighting fixture of claim 80 wherein said resulting spectrum does not have a valley at a longer wavelength than the maximum spectral peak in the area from 400 nm to 700 nm.

83. The lighting fixture of claim 78 wherein said white light can be generated at a color temperature within preselected range of color temperatures.

84. The lighting fixture of claim 81 wherein said range of color temperatures includes at least one color temperature from the range 500K to 2500K.

85. A method for generating light comprising:

mounting a plurality of component illumination sources producing electromagnetic radiation of at least two different spectrums in such a way mix the spectrums; and

choosing said at least two different spectrums in such a way that the mix of the spectrums has intensity greater than background noise at its lowest valley.